

NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD  
Connecticut/Rhode Island  
DRY HYDRANT  
(No.)  
Code 432

**DEFINITION**

A standpipe and fittings installed at the end of a pipeline that permits withdrawal of water from the source by pumping.

**PURPOSE**

To provide a frost-free access point for the transfer of water from a source, by pumping, into a transport vehicle or distribution system.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice is applicable:

1. Where conveyance of water in a closed conduit from a source to another point may be facilitated by pumping from a fixed standpipe.
2. Where a remote water source may be made safely accessible at a pumping point for filling tank trucks and pumper trucks engaged in fire control and protection.
3. Where required to transfer water from a remote source for other beneficial usage.

**EFFECTS ON WATER QUANTITY AND QUALITY**

Water quantity available for fire protection will be increased by the installation of dry hydrants. Water quantity at the source will be reduced by the use of the dry hydrant.

Dry hydrants will have no effect on the water quality of the source. Public safety will be enhanced by the installation of dry hydrants.

Dry hydrants will have negligible long-term impact on ground water quantity.

Erosion and resulting sediment may occur during dry hydrant construction. These disturbed areas may generally be limited in extent, and should not be a factor past one growing season.

**FEDERAL, STATE, AND LOCAL LAWS**

Design and construction activities shall comply with all federal, state, and local laws, rules, and regulations governing activities in or along streams or wetlands, pollution abatement, health, and safety. The owner or operator shall be responsible for securing all required permits or approvals and for performing the work in accordance with such laws and regulations. NRCS employees are not to assume responsibility for procuring these permits, rights, or approvals, or for enforcing laws and regulations. NRCS may provide the landowner or operator with technical information needed to obtain the required rights or approvals to construct, operate, and maintain the practice.

Permits may be required from the following agencies:

1. US Army Corps of Engineers
2. Connecticut Department of Environmental Protection, Inland Water Resources Division

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3. Connecticut Department of Environmental Protection, Office of Long Island Sound.
4. Rhode Island Department of Environmental Management, Division of Freshwater Wetlands
5. Town Inland Wetland Conservation, and Planning and Zoning Commissions.

## DESIGN CRITERIA

The plan and design shall be based on adequate surveys and investigations as outlined in Chapters 1 and 5, Engineering Field Manual. A topographic profile from the water source to the point of delivery will usually be required. Soil borings will be required to determine the depth to bedrock and ascertain the feasibility of the site.

### Capacity

The pipe size shall be large enough to deliver the required volume of water to the designated location at the desired pumping rate.

When the purpose of the dry hydrant is for fire control, the minimum size pipeline shall be 4 inches (10cm) inside diameter and the minimum pumping rate shall be 250 gpm (946 l/min). However, a pipe size of 6 inches (15cm) in diameter and pumping rates of 750 gpm (2839 l/min) to 1000 gpm (3785 l/min) may be more appropriate if the owner or sponsor intends on transporting the water to other locations. The owners or sponsors should specify the pipe diameter and flow rate, in excess of the minimum, required to meet the ISO class for fire protection.

The total pumping head for the system will not exceed the allowable heads as shown on form CT/RI-ENG-70.

The equations on standard drawings CT/RI-ENG-70 or TSC-NE-ENG-606 may be used.

Other equations may be taken from EFM Chapter 3.

### Placement

Dry hydrants shall be placed so that they are protected against hazards imposed by traffic, farm operations, freezing temperatures, or soil cracking. Other means of protection shall be provided where the depth required for protection is impracticable due to shallow soils over rock or for other reasons. The location of the dry hydrant shall be such that it is not a hazard to traffic or persons, yet is easily accessible from the roadway.

The layout for the dry hydrant shall avoid, where possible, areas where potential slope failures are likely to occur. Where potential slope failures are anticipated, the pipeline should be approximately normal (90 degrees) to the contour.

Six foot high locating posts or signage shall be installed adjacent to the hydrant to aid in finding the hydrant if covered by snow.

The roadway providing access to a dry hydrant shall be an all weather road sufficient to withstand heavy truck traffic and shall meet or exceed the requirements of practice standard 560, Access Road.

### Materials

Pipe will be designed to meet the strength and pressure requirements for the conditions at the site. TR-77 may be used to design plastic pipe installations.

Watertight joints having a strength equal to that of the pipe shall be used. Fittings shall be of the same material as the pipe. If corrosion is anticipated, the fittings shall be protected.

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Steel pipe shall meet the requirements specified in ASTM A120 or in AWWA C200. If, because of local conditions, a coal-tar enamel protective coating is needed for steel pipe, the coating shall meet the requirements of AWWA C203. Plastic pressure pipe is permissible for underground use.

Plastic pipe shall conform to the requirements of the following ASTM specifications:

D1785, Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120  
D2241, Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR) [SDR 26 or lower]  
D2665, Polyvinyl Chloride (PVC) Drain, Waste, and Vent Pipe and Fittings  
D1527, Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedules 40 and 80  
D2282, Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR) [SDR 26 or lower]

Standard thermoplastic pipe material designation code for PVC pipe shall be 1120 or 1220 and for ABS pipe it shall be 1316 or 2112.

Pressure pipe fittings shall conform to the requirements of the following ASTM specifications:

D2466, Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40  
D2467, Socket-Type Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80  
D2464, Threaded Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80  
D2468, Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 40  
D3139, Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals

Material designation for PVC pipe fittings shall be PVC I or PVC 12 and for ABS pipe fittings

the designation shall be ABS 13 or ABS II.

Solvents for solvent-welded pipe joints shall conform to the following ASTM specifications:  
D2564, Solvent Cements for Polyvinyl Chloride (PVC) Plastic Pipe and Fittings  
D2235, Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings  
D2855, Making Solvent-Cemented Joints with Polyvinyl Chloride (PVC) Pipe and Fittings

Rubber gaskets for pipe joints shall conform to the requirements of ASTM F477, Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

#### Protection and Esthetics

The visual design of standpipes in areas of high public visibility and those in fragile areas shall be carefully considered.

Erosion control measures shall be installed where needed for good conservation practice.

Vegetation shall be established in accordance with the critical area planting standard (342).

### **PLANS AND SPECIFICATIONS**

Plans and specifications for installation of dry hydrants shall be in keeping with this standard and shall describe the requirements for application for the practice to achieve its intended purpose. Resources available are standard forms CT/RI-ENG-70 or TSC-NE-ENG-606 and NEH-20 specifications or the specification attached to this standard.

### **OPERATIONS AND MAINTENANCE**

Long-term functioning of the dry hydrant system may be insured by the periodic inspection, and repair where necessary, of the components.

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The following items are guidance for inspection of the system on an annual basis, or after every use by fire protection pumpers.

1. The visible pipe and fittings should be inspected for damage and repaired, if necessary. Remove and clean hydrant screen if needed. Protect exposed portions of plastic pipe from damage due to ultraviolet light by painting with an exterior latex paint.
2. Soil material cover over the pipeline should be replaced if lost due to settlement or erosion. This is important for the protection and stability of the pipeline and standpipe.
3. The hydrant should be test-pumped once annually to determine if the capacity of the hydrant is reduced below the design level. If reduced, the cause must be determined and corrected. This may include replacement of the intake screen, and/or portions of the pipeline. Back-flushing the system may help remove any blockage, however, caution should be exercised as high pressures may damage the system. Use gravity flow or pressures less than 50 psi (.345 Mpa) for back-flushing.
4. If possible, the intake area should be inspected and gravel filter or support posts replaced as necessary.
5. Vegetation and surface protection around the hydrant shall be maintained for ease of use during emergency conditions. The access road shall also be inspected and maintained as necessary to keep the site in an erosion-free condition and provide continuous all-weather access.

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## **CONSTRUCTION SPECIFICATION DRY HYDRANT**

### **Excavation**

Trenches for plastic pipelines shall be free of rocks and other sharp-edged materials. Pipe shall not be laid on rock unless special protective measures are installed, such as excavating the trench one (1) foot deeper than required and back-filling with clay or other suitable soil.

### **Testing**

Testing before backfilling is not required.

### **Materials**

All materials shall be inspected to verify that they meet the requirements shown on the drawings. Pipe and fittings used for the pipeline shall be new.

Steel pipe shall meet the requirements specified in ASTM A120 or in AWWA C200. If, because of local conditions, a coal-tar enamel protective coating is needed for steel pipe, the coating shall meet the requirements of AWWA C203. Plastic pressure pipe is permissible for underground use. The pipe shall conform to the requirements of the following ASTM specifications:

D1785, Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, 120  
D2241, Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR) [SDR 26 or lower]  
D2665, Polyvinyl Chloride (PVC) Drain, Waste, and Vent Pipe and Fittings  
D1527, Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedules 40 and 80  
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Standard thermoplastic pipe material designation code for PVC pipe shall be 1120 or 1220 and for ABS pipe it shall be 1316 or 2112.

Pressure pipe fittings shall conform to the requirements of the following ASTM specifications:

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D2464, Threaded Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80  
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Rubber gaskets for pipe joints shall conform to the requirements of ASTM F477, Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

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## **Backfilling**

All backfilling shall be completed before the line is placed in service. The trench shall be kept free of standing water to allow for proper placement and compaction of the backfill.

For plastic pipe, the initial backfill shall be Type 1 or 2 as specified on the drawings, and as follows:

Type 1 - The pipe will be embedded in fine grained soil backfill (CL, ML, or SM soil) free from rocks or other sharp-edged material that would damage the pipe and hand compacted in 6-inch (15cm) lifts to one pipe diameter above the top of the pipe. Compaction shall consist of four passes of the compaction equipment over each lift.

Type 2 - The pipe shall be embedded in soil material as described in Type 1 above except that the soil shall be compacted to 95% of standard proctor (ASTM D698 method A) density with soil at  $\pm 2\%$  of optimum moisture content; or the pipe will be embedded in a sand/gravel material to a depth of one pipe diameter above the top of the pipe. Acceptable sand/gravel mixtures are: ASTM C33 sand, #6, #7, #8 or #67 aggregate and shall be hand compacted in 6-inch (15 cm) lifts with four passes of vibratory or other hand operated compaction equipment.

The remaining trench backfill and backfill of installations where steel pipe is used shall be such that the density of the backfill shall be at least equal to the natural density of the trench sidewalls. Deformation or displacement of the pipe shall not occur during backfilling.

Over excavation of the trench bottom shall be backfilled to the same requirements as specified for the initial backfill around the pipe.

The soil moisture content of the backfill material, for all conditions except Type 2 initial backfill above, shall be moist enough that a ball can be formed when the soil is squeezed in the hand but not so wet that water runs out of the ball when squeezed.

Backfill of plastic pipe shall be initiated after the pipe reaches the same temperature as the water or soil. This can be done in a number of ways, such as filling the pipe with water or by leaving the trench open overnight before backfilling, providing adequate trench safety protection is installed.

## **Protection**

Construction operations shall be carried out in such a manner and sequence that soil erosion will be minimized. All disturbed areas shall be graded smooth and free draining and blended with the surrounding ground prior to the seeding operation.

Guard posts, signs or other safety measures shall be installed as shown on the drawings.

Access roads, when required, shall be constructed to meet the requirements of the drawings and specifications.

Areas disturbed by construction shall be stabilized by the establishment of vegetation. Lime and fertilizer shall be spread at the rate shown on the drawings and shall be raked or tilled into the soil to a depth of 2 inches (5 cm) to prepare a seedbed. Seed and mulch shall be spread at the rate shown on the drawings. Temporary mulch shall be used when climatic or other conditions do not readily permit establishment of permanent vegetation.

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